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ABSTRACT

America is faced with making systemic changes in education that will insure continuance of her leadership role in the 21st century. In an effort to make changes toward the aforementioned reforms, the federal government has charged 16 participating Federal agencies with achieving goals that will ensure that all students learn to use their minds well so they may be prepared for responsible citizenship, further learning, and productive employment in the economy. This article describes the strategic plan for education outlined by the National Aeronautics and Space Administration (NASA), one of the sixteen participating organizations. Included in the document are (1) a list of NASA's goals regarding education reform; (2) descriptions of programs, on the elementary, and secondary, and higher education level, designed to improve the technological competence of students; (3) technology and evaluation programs; (4) educational publications to supplement programs; and (5) a resource section which lists NASA's national and regional Teacher Resource Centers and introduces the reader to NASA's Central Operation of Resources for Educators (CORE). CORE distributes materials in audiovisual format. (ZWH)

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National Aeronautics and
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Office of Human Resources
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Education Division
September 1993

ED 370 807

NASA's Education Program

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NASA's Education Program

EP-297

Office of Human Resources and Education

Education Division

September 1993

National Aeronautics and
Space Administration
Washington, D.C.
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NASA programs allow students across the country to explore opportunities for careers in science, mathematics and technology.

NASA's Education Program

In the 1990's, America is faced with reforming its education system to improve the competitiveness of our Nation in the world community. To maintain a leadership role in the 21st century, the National Aeronautics and Space Administration and other Federal agencies must take steps to contribute to this systemic reform of American education. The National Aeronautics and Space Administration's (NASA's) Education Vision is to promote excellence in America's education systems by enhancing and expanding scientific and technological competence. Fulfillment of NASA's Vision will insure a sufficient talent pool to preserve NASA and U.S. leadership in aeronautics, space science, and technology in the next century. Headquartered in Washington, D.C. with activities at NASA's nine Field Centers, NASA's education program supports the national education reform movement.

Focus on the National Education Goals

The Federal Government's 1994-1998 strategic plan for science, mathematics, engineering, and technology education was developed by the Federal Coordinating Council for Science, Engineering, and Technology's Committee on Education and Human Resources (FCCSET/CEHR). It focuses the programs of 16 participating Federal agencies, of which NASA is one, on achieving the following three of the six National Education Goals:

- American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter, including mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in the economy.
- U.S. students will be first in the world in science and mathematics achievement.
- Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

Students participate in NASA programs to stimulate their interest in mathematics, science, and technology.

NASA's Strategic Plan for Education

To focus on achieving these goals, NASA has developed *NASA's Strategic Plan for Education: A Strategy for Change: 1993-1998*. This plan outlines three goals to provide direction for NASA to reach it's Education Vision:

1. To maintain the segment of NASA's current education program–or the base or core program–that is judged to be effective, based on internal and external customer measures of success. Such maintenance involves individual program revision, expansion, or elimination.

2. To implement new education reform initiatives that specifically address NASA mission requirements, national education reform, and FCCSET priorities.

3. To expand the impact of the NASA education program significantly by developing partnerships with key external constituencies.

NASA's Three Enabling Systems

Underpinning each goal are three "enabling systems": evaluation, educational technology, and dissemination.

Evaluation provides agency direction and plans to ensure that our education programs meet the needs of our customers—the education community. Educational technology outlines objectives to ensure that we maximize NASA's limited resources and expand the delivery of programs and materials to the broadest possible audience through the appropriate use of technologies. Dissemination provides a two-component systems approach to ensure that information and materials are known by and available to the broadest possible segment of the education community.

Strategic Plan as Tool to Fulfill NASA's Education Mission

The strategic plan provides direction to NASA's education program in meeting the National Education Goals.

NASA's Education Program delivery strategy *captures* student interest in science, mathematics and technology at an early age; *channels* students into science, engineering, and technology career paths; and *enhances* the knowledge, skills, and experience of precollege teachers, college and university faculty, and other professional educators.

NASA is working to utilize its inspiring mission, its unique facilities, and its specialized workforce to conduct and to leverage externally conducted science, mathematics, and technology education programs and activities.

At the elementary and secondary levels, NASA uses its mission to enhance the knowledge, skills, and experience of teachers to capture the interest of students and channel that interest into career paths through the demonstration of integrated applications of science, mathematics, technology, and related subject matter.

At the higher education level, NASA provides undergraduate and graduate student incentives and opportunities and supports faculty preparation and enhancement through programs featuring active participation in NASA research.

Publication Objective

This publication presents NASA's current education programs, which will be examined under its Strategic Plan for Education. It is NASA's first goal to maintain this base...revising, expanding, or eliminating programs as necessary. Through NASA's second goal, new education reform initiatives will be added which specifically address NASA mission requirements, national educational reform, and FCCSET priorities.

The chapters in this publication are divided by educational levels, with additional sections on programs to improve the technological competence of students and on an array of NASA published materials to supplement programs. The resource section lists NASA's national and regional Teacher Resource Centers and introduces the reader to NASA's Central Operation of Resources for Educators (CORE), which distributes materials in audiovisual format.

The names of universities participating in NASA's National Space Grant College and Fellowship Program are also provided. Under the Space Grant program, state consortia form a national network of colleges and universities, space-related industry, state and local governments and nonprofit organizations. Each consortium receives NASA funds in research, education and public service.

The section provides the reader with the variety of organizations with which NASA is working to fulfill its third strategic goal, "to expand the impact of the NASA education program significantly by developing partnerships with key external constituencies."

As a Government agency whose basic product is the advancement of human knowledge, NASA hopes that the inspiration and intellectual excitement inherent in the Aeronautics and Space Program will enrich the study of social sciences, physical sciences, mathematics, and technology at all levels of education. The programs demonstrate that NASA is committed to promoting excellence in education, bringing more prestige to the teaching profession, and increasing awareness of the impact science and technology will have on the quality of life in the 21st century.

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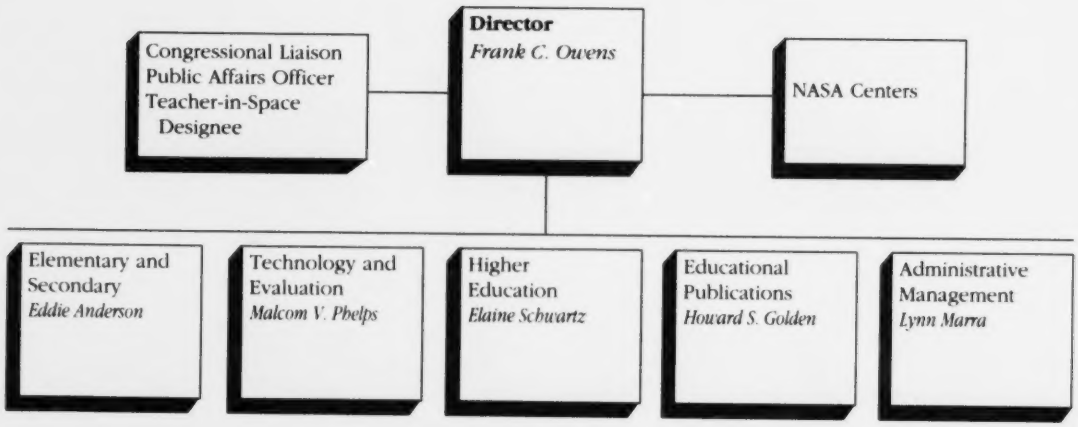
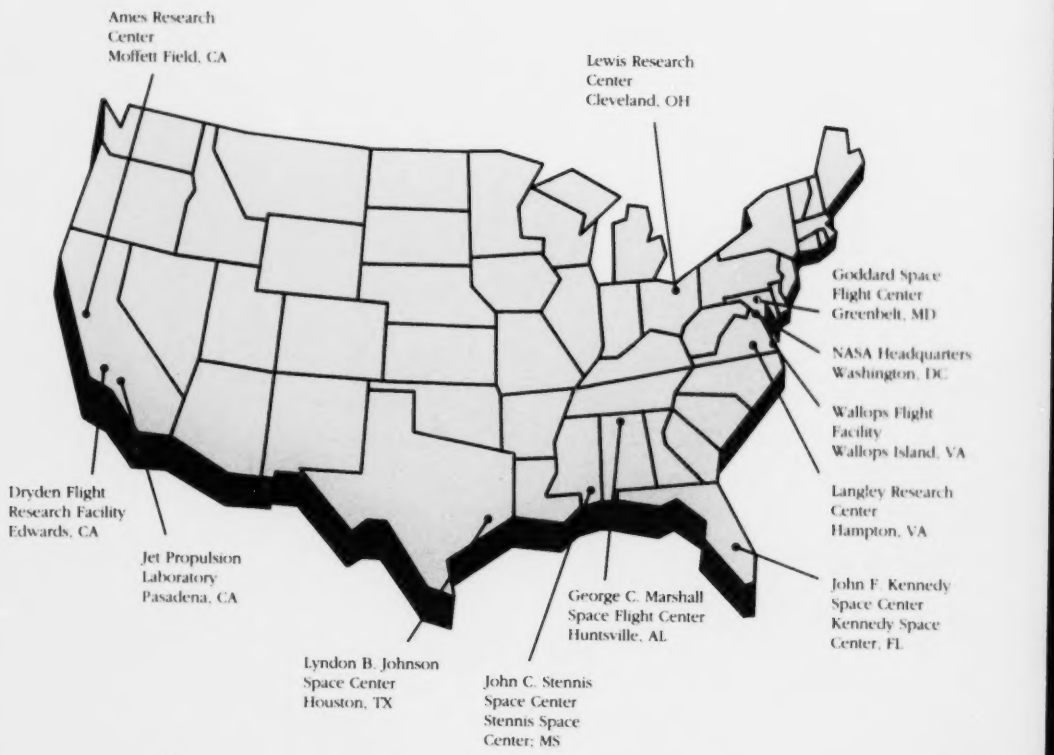


NASA Field Centers



NASA's national education program is carried out through Headquarters and the Field Centers.

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NASA's programs seek to demonstrate the application of science, mathematics, technology and other subject matter in NASA's quest for new knowledge and understanding in aeronautics, Earth and space science.

Elementary and Secondary Programs

Teachers study the principles of rocketry in a NASA Educational Workshop for Elementary School Teachers (NEWEST).

In the academic community, it is understood that students become interested in science, mathematics, and technology at an early age. However, unless specific steps are taken to capitalize on this interest during a child's early years, there is little likelihood that a child will choose to pursue a career as a scientist, engineer, or technician. NASA's programs seek to demonstrate the application of science, mathematics, technology and other subject matter in NASA's quest for new knowledge and understanding in aeronautics, Earth and Space science.

In an effort to nurture this early enthusiasm, NASA has developed a broad range of programs and services for students at the elementary and middle school levels. These programs are specifically designed to use space and aeronautics as the vehicle to capture students' interest in science, mathematics, and technology.

Once student interest has been captured at the elementary and middle school levels, it is imperative to follow through at the secondary level by offering a broad and diverse set of both informal and formal educational experiences for high school students. This is the second element in NASA's three-pronged educational strategy, which is intended to channel secondary students into science, engineering, and technology career paths.

The third element is being realized through programs for educators which have been specifically designed to enhance their knowledge, skills, and experience. By targeting educators as part of our educational strategy, NASA hopes to play a significant role in ensuring that students and educators alike are provided today with the tools they will need tomorrow.

NASA is particularly concerned that minorities, the fastest growing segment of the population, are not proportionally represented on science, mathematics, and technology career paths. Studies indicate that by the year 2000, in the United States, one of every three citizens will be members of minority groups. These are groups which traditionally have not been adequately represented in the science and engineering workforce. If the potential of minorities is not nurtured and developed today, the United States may fall critically short of having qualified people to meet science and technology workforce needs in the future. NASA, in a continuing effort to reverse these trends, offers educational programs that are specifically tailored for underrepresented minority students at the middle and high school levels, as well as for minority teachers and faculty members.

NASA Programs for Students

Aerospace Education Services Program (AESP)

The objectives of the Aerospace Education Services Program (AESP) are: (1) to disseminate, in an educational format, scientific and technical information on NASA activities and research; (2) to promote NASA research and development in aeronautics and space through lecture/demonstration programs and teacher workshops; (3) to involve educators and students at all levels in aerospace-oriented learning activities; and (4) to promote the professional development of pre-service and in-service educators.

AESP is one of NASA's premier outreach programs, reaching millions of students each year with its traveling aerospace education units, which bring the aerospace program into our Nation's schools. These units travel to all parts of the country, conducting classroom and assembly programs on the principles of rocketry, living and working in space, aeronautics, space science, and NASA's history and accomplishments. They also provide the most up-to-date information about current and future NASA projects. Prior to a visit, AESP specialists, all of whom are former teachers, make an initial contact with the school to identify any specific educational topics of interest. This information is used by the specialist to customize the program to meet a school's curricula needs. The specialist also encourages inclusion of an in-service workshop

prior to the visit to familiarize teachers with the program content and further identify specific areas of interest. (See information on the in-service component of AESP, page 9.)

A typical AESP visit consists of an assembly that includes a basic introduction to NASA. Using a variety of demonstrations and models, the specialist talks about the contributions NASA has made in science and other aerospace-related areas and often involves the students by asking for volunteers to participate in the program. The remainder of the visit is spent visiting classrooms as requested and expanding on areas covered during the assembly. This can include consulting with teachers or demonstrating new technologies and materials.

AESP visits are initiated at the request of schools and requests should be directed to the Center Educational Programs Officer (CEPO) at the NASA Field Center serving the applicable geographic area. However, because this program is in great demand, there is usually a long waiting list. For this reason, while Field Centers make every effort to accommodate all requests as quickly as possible, requests for visits should be initiated well in advance.

For more information, contact:

The Center Educational Programs Officer at the Field Center serving the school's geographic area (See page 12.)

or

Elementary and Secondary Branch
Education Division
Mail Code FEE
NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

An Aerospace Education Services Program Specialist shows a student how the Space Shuttle works during an outreach program.

NASA Space Science Student Involvement Program

This NASA program provides contests and challenges using subjects as diverse as science, writing, and art to involve elementary, middle, and secondary students in Space activities.

Art and Writing Competition
For individual art competition, students across the country in Grades 3-12 can enter the Interplanetary Art Competition. Students develop a two-dimensional illustration depicting a scene from interplanetary space, known or unknown.

Science Competitions
Grades 3-5 are offered entrance to the **Future Aircraft/Spacecraft Design Competition**. A team of students uses creative, artistic, and written skills to illustrate and explain an original design of a futuristic aircraft or spacecraft. The students create 3 two-dimensional illustrations showing a complete view of the craft, a schematic view of the craft's interior, and a drawing of a special function they may want to highlight.

Mission to Planet Earth Project is for students in grades 6-8. Teams of students develop an interdisciplinary program that would use space technology to investigate the effect of human activity on the Earth's ecosystem.

In the **Mars Science Expedition Project,** students in grades 9-12 use text and illustration to plan and design an expedition to Mars and propose an experiment to be done sometime during the journey.

The **Aerospace Internship Competition**, is also designed for students in grades 9-12. Students propose and write experiments to do during internships at one of the following facilities:

1. The *Numerical Aerodynamic Simulation (NAS) computer* at NASA at Ames Research Center in Moffett Field, California.

2. The *Drop Tube Zero Gravity Research Facility* at NASA Lewis Research Center in Cleveland, Ohio.

3. The *Wind Tunnel testing facility* at the NASA Langley Research Center in Hampton, Virginia.

4. *The Space Station internship* at the Johnson Space Center in Houston, Texas.

Each of the proposals needs a precise nine-part format and may not exceed 1,000 words. Proposals must not require open flames, toxic chemicals, temperature extremes, high-voltage discharge, or mammals other than humans as test subjects.

Each year a new entry form with detailed instructions is available in the fall from the Education Division.

For more information, contact:

National Science Teachers Association
1840 Wilson Blvd.
Arlington, VA 22201
(703) 243-7100

or

Elementary and Secondary Branch
Education Division
Code FEE
NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

Students develop a project for national competition in the Space Science Student Involvement Program.

Summer High School Apprentice Research Program (SHARP)

The objective of the SHARP program is to channel students in groups that traditionally have not been represented in mathematics, science, and engineering into careers in these fields. SHARP exemplifies NASA's effort to establish individual mentoring relationships between students and active researchers. Selected students have a demonstrated interest and aptitude for science, mathematics, and technology-related areas. This program seeks to strengthen the Nation's ability to remain preeminent in mathematics, science, and technology while increasing the pool of talent in communities that have not been traditionally represented.

SHARP offers minority group students an opportunity to participate in intensive science and engineering research at a NASA Field Center. Each summer, approximately 200 students take part in this program.

As apprentices, students are assigned to work with a NASA mentor in a science or engineering research area. Under the careful supervision of NASA personnel, students carry out assignments, prepare reports, make oral presentations, and take part in enrichment activities such as career counseling and field trips.

U.S. citizens with a strong interest in and an aptitude for math, engineering, and/or the sciences who will be at least 16 years old prior to June of a given program year, who are members of a minority group, and who live within commuting distance of a participating Field Center are considered. Participants are paid by and employed under the Stay-in-School Program or the Summer Aid Employment Authorities.

Interested students may obtain a program brochure with an application from the NASA Headquarters program manager or the local NASA Field Center coordinator.

For more information, contact:

Elementary and Secondary Branch
Education Division
Code FEE
NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

Chief, Training and Special Programs Branch
Mail Stop 241-3
NASA Ames Research Center
Moffett Field, CA 94035

Assistant Chief
Fluid and Flight Mechanics Branch
NASA Dryden Flight Research Facility
P.O. Box 273
Edwards, CA 93523

Educational Programs Officer
Public Affairs Office
Bldg. 8, Rm. 150
NASA Goddard Space Flight Center
Greenbelt, MD 20771

Program Officer
Code AH3
Human Resources Development Branch
NASA Johnson Space Center
Houston, TX 77058

Student Programs Coordinator
Education and Awareness Branch
Code PA-EAB
NASA Kennedy Space Center
Kennedy Space Center, FL 32899

Office of Education
Mail Stop 400
NASA Langley Research Center
Hampton, VA 23681

Public Information Specialist
Educational Services Office
Mail Stop 7-4
NASA Lewis Research Center
21000 Brookpark Rd.
Cleveland, OH 44135

Program Officer
Personnel Office
Code CM-22
NASA Marshall Space Flight Center
Huntsville, AL 35812

Program Officer
Human Resources Office
Code BA00
NASA Stennis Space Center
Stennis Space Center, MS 39529

Urban Community Enrichment Program (UCEP)

The objectives of the Urban Community Enrichment Program (UCEP) are (1) to provide urban youth with greater exposure to space topics in an interdisciplinary manner; (2) to foster direct teacher/parent involvement in the aerospace education process; (3) to increase teacher and community awareness of NASA resources and technical assistance programs that can be used to supplement existing curricula; (4) to raise the awareness of multicultural contributions to aerospace; (5) to foster greater student awareness of careers in mathematics, science, and engineering; and (6) to motivate students to improve their reading, writing, and mathematics skills.

This program is specifically designed to serve middle school students in urban areas.

The UCEP program is planned, coordinated, and implemented in participating schools by a NASA team. Major activities include lectures, demonstrations, and hands-on classroom activities highlighting the various sciences that supplement the ongoing curriculum. In addition, workshops and other activities are offered to school personnel.

UCEP exposes teachers *and middle* school children from urban communities to interesting and broadening educational activities. Special emphasis is placed on communications, logic, and reasoning skills that are curriculum-related. Technical and logistical assistance is supplied by the NASA UCEP Coordinator. In preparation for the program, NASA Aerospace Education Specialists train core teachers as a team to conduct interdisciplinary aerospace activities in school districts.

Superintendents, with suggestions from principals, select core teachers from schools in their districts. The core teachers devote eight weeks to working with the aerospace program in their schools, where they lead interdisciplinary teams of teachers in interactions with the principal and faculty. They also ensure that all preparations are made for implementing the aerospace program.

For more information, contact:

The Center Educational Programs Officer at the Field Center serving the school district's geographic area (See page 12.)

or

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NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

This UCEP workshop exposes teachers to "aerodynamics principles."

Science and Engineering Fairs

The objectives of NASA's involvement in science and engineering fairs are (1) to stimulate interest in aeronautics and the space sciences among middle and secondary school students; (2) to involve students and their teachers in aerospace-oriented projects by encouraging students to investigate problems related to existing NASA programs; and (3) to expose students and their teachers to careers at NASA through the opportunities that are presented during fairs to communicate with NASA personnel.

Science Service, a nonprofit organization that works to improve science education, administers the International Science and Engineering Fair for high school students in 13 science- and math-related categories each May. The competition is the culmination of almost 400 regional and State science and engineering fairs held worldwide during the preceding school year.

Science Service presents cash awards in each category. NASA, along with more than 65 other organizations, takes part by recognizing students with outstanding projects in aeronautics and the space sciences, mathematics, and space technology and applications. At the regional and state levels, NASA awards certificates, with additional awards determined by the Field Center serving the geographic area where the competition is held. Participation in NASA's award program must be requested by fair directors, and NASA depends on individual science and engineering fair judges to select students to receive NASA certificates. For the international fair, NASA sends its own team of judges, who select 10 students to receive an educational trip, with their teachers, to a NASA Field Center. NASA judges also select up to 15 students for Honorable Mention awards.

Directors of local science fairs who are not affiliated with the international fair can participate in NASA's award system by requesting additional information from the Center Educational Programs Officer at the Field Center serving their geographic area.

For more information, contact:

Science Service
1719 N St., NW
Washington, D.C. 20036
(202) 785-2255

or

Elementary and Secondary Branch
Education Division
Code FEE
NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

or

The Center Educational Programs Officer at the Field Center serving the school's geographic area *(See page 12.)*

Finalists of this Science and Engineering Fair are chosen from regional and state science and engineering fairs held worldwide.

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MATHCOUNTS

The objectives of MATHCOUNTS are (1) to bring about improvement in mathematics curricula and instruction in 7th and 8th grades; (2) to elevate the prestige associated with achievement in mathematics among 7th and 8th grade students; and (3) to increase awareness among parents, educators, and the general pubic of the importance of mathematics.

MATHCOUNTS is an annual mathematics competition for 7th and 8th grade students that brings a number of organizations together in a cooperative effort to promote and reward excellence in mathematics. The program is administered by the MATHCOUNTS Foundation and supported by the National Society of Professional Engineers, the CNA Insurance Companies, NASA, the Cray Research Foundation, the General Motors Foundation, the National Council of Teachers of Mathematics, and the U.S. Department of Education. In addition, the program is supported by sponsors from industry and other organizations with an interest in promoting math achievement.

Beginning in September each year, teachers coach MATHCOUNTS students in mathematics skills and teamwork. In addition to basic arithmetic, students study math logic, probability and statistics, linear algebra, and polynomials.

Each February, four students are selected to represent each participating school, and the first local and regional competitions begin. Competitions become progressively more difficult at each level. State competitions are held in April. The competition cycle culminates each year in May, when four students from each State, the District of Columbia, Guam, Puerto Rico, the Virgin Islands, and State Department and Department of Defense Schools travel to Washington, D.C., for the National competition.

All students who take part in MATHCOUNTS receive trophies, certificates, and/or prizes. The National champion receives a trophy, a medal, a scholarship, a computer and a scholarship to U.S. Space Camp in Huntsville, Alabama. The members of the first-place team also receive trophies and a trip to U.S. Space Camp. NASA sponsors the students' week-long trip to U.S. Space Camp and awards a four-day mathematics workshop at a NASA Field Center to the top eight coaches in the national competition.

For more information, contact:

MATHCOUNTS Foundation
1420 King St.
Alexandria, VA 22314
(703) 684-2928

or

Elementary and Secondary Branch
Education Division
Code FEE
NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

Programs for Educators

Aerospace Education Services Program (AESP) In-Service Component

An Aerospace Education Services Program specialist can provide a workshop for teachers, presenting ways in which aerospace topics may be applied or integrated into subject matter. The content of the workshop depends on specific areas of interest to a particular school, and can incorporate space-related topics into the school's curriculum or supplement an existing curriculum. The specialist can also provide resource materials and other information to assist in curriculum enrichment. In areas where the program will be presented at more than one school, as may be the case in a large school district, more than one specialist may be made available.

For more information, contact:

The Center Educational Programs Officer at the Field Center serving the school's geographic area (See page 12.)

or

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Washington, D.C. 20546
(202) 358-1518

NASA Educational Workshop for Elementary School Teachers (NEWEST)

The objectives of NEWEST are (1) to recognize and involve outstanding teachers and (2) to provide a leadership program for updating and renewing their backgrounds and skills in science, mathematics, and technology.

NEWEST gives elementary school teachers an opportunity to spend two weeks at a NASA Field Center learning about space and aeronautics. Those selected for participation take part in seminars conducted by NASA scientists and engineers, learn about current research and projects and, more importantly, are provided with techniques to assist them in incorporating aerospace-related topics into their curriculum. Participants are also provided with a variety of educational materials to integrate into their classroom instruction.

All workshops are two weeks in duration and are conducted between June 15 and August 15. Costs for travel, housing, meals, and graduate credit are included. Each workshop currently hosts 23-25 teachers. The specific program content varies among Field Centers, depending on each Center's area of expertise.

NEWEST is cosponsored by NASA and the National Science Teachers Association (NSTA) in cooperation with the National Council of Teachers of Mathematics (NCTM) and the International Technology Education Association (ITEA).

Applicants must be full-time elementary teachers (K-6) in public or private schools in the U.S. and U.S. Territories, Department of Defense Dependent Schools, Department of State Overseas Schools, or Bureau of Indian Affairs Schools. Each applicant must be a U.S.citizen, have a minimum of five years teaching experience and hold a teaching certificate in elementary education. The sponsors of this program encourage teachers from underrepresented minority groups to apply.

Interested teachers should request the application form from the NASA Field Center serving their geographic area, (see page 12), or from NSTA at the address listed below. The application deadline is mid-February, with selection notification occurring in mid-April.

For more information, contact:

National Science Teachers Association
1840 Wilson Blvd
Arlington, VA 22201
(703) 243-7100

or

Elementary and Secondary Branch
Education Division
Code FEE
NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

NASA Educational Workshops for Mathematics, Science, and Technology Teachers (NEWMAST)

The objectives of NEWMAST are (1) to recognize and involve outstanding teachers and (2) to provide a leadership program for updating and renewing their backgrounds and skills in science, mathematics, and technology. NEWMAST gives outstanding mathematics, science, and technology teachers an opportunity to spend two weeks at a NASA Field Center studying NASA's latest technological information. Those selected for participation observe current state-of-the-art research and development activities, interact with NASA scientists and engineers, and receive a variety of educational materials to share with their peers and students.

NEWMAST workshops are held during the summer and include travel expenses, housing, meals, and graduate credit. Each workshop hosts approximately 25 teachers. The specific content of workshops varies from Field Center to Field Center depending on their areas of concentration.

NEWMAST is cosponsored by NASA and the National Science Teachers Association (NSTA) in cooperation with the National Council of Teachers of Mathematics (NCTM) and the International Technology Education Association (ITEA).

Full-time teachers of mathematics, science, or technology in grades 7-12 in public and private schools in the U.S. and the U.S. territories, Department of Defense Dependent Schools, Department of State Overseas Schools, and Bureau of Indian Affairs Schools are eligible to apply. All participants must be U.S. citizens and have a minimum of five years of teaching experience. In addition, the sponsors of NEWMAST encourage outstanding teachers from underrepresented minority groups to apply in an effort to increase minority participation in this program.

Interested teachers should obtain the application form from the NASA Field Center serving their geographic area, (see page 12), or from NSTA at the address listed below. The application deadline is mid-February, with selection notification in mid-April.

For more information, contact:

National Science Teachers Association
1840 Wilson Blvd.
Arlington, VA 22201
(703) 243-7100

or

Elementary and Secondary Branch
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NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

Other Teacher Workshops

NASA's Field Centers provide valuable assistance in implementing many of the programs described in this brochure. In addition, because each Field Center's mission is unique in the type of research or other activities it conducts, many Centers conduct their own Center-specific workshops for teachers at the elementary and secondary levels. These workshops can cover such diverse topics as astronomy, aeronautics, life in space, the principles of rocketry, Earth science, and remote sensing.

These workshops are held during the summer months and are conducted by the same AESP specialists who spend the school year on the road visiting schools. While the content of these workshops varies from Field Center to Field Center, all workshops stress the importance of providing participants with the resources and background necessary to supplement and enrich existing curricula.

For more information, contact:

The Center Educational Programs Officer at the Field Center serving the school's geographic area (See page 12.)

or

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Education Division
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NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

Community Involvement Program (CIP)

General Program

The Community Involvement Program is a unique, multi-dimensional service that seeks to involve not just schools, but service clubs, local government officials, and the private sector in a community-wide program that places special emphasis on the educational value of the Nation's space program. CIPs are as varied as the communities in which they are held, but all are designed to involve the entire community as much as possible.

CIPs are usually initiated at the request of a school administrator or State education official. Once a community has been selected, NASA officials and educators within the community meet to plan the program and its duration, which can range from a week to as long as a month. AESP specialists usually form the core of the program, with additional NASA personnel added as desired or needed. While no two CIPs are alike, a typical program includes many of the elements of an AESP visit in an expanded format. This might involve comprehensive in-service workshops, community exhibits, competitions for students, workshops, and assemblies for both students and the general public, and other public events.

It is not unusual for CIPs to take on a festive atmosphere as the entire community injects a space-related theme into residents' everyday lives. CIPs have netted a variety of ingenious and imaginative activities. One school rewrote school menus to incorporate space-related descriptions. Another community's students converted a school bus into a mock Space Shuttle and simulated a launch sequence, right down to the actual "launch," complete with special effects.

CIPs are extremely well-received and are in great demand. Unfortunately, due to limited resources and the intensive nature of these programs, it is impossible for NASA to conduct more than four or five CIPs each year. For this reason, smaller school districts are encouraged to contact other school districts, or possibly a State education official, in an effort to widen the geographic area proposed for this program.

For more information, contact:

The Center Educational Programs Officer at the Field Center serving the school's geographic area *(See page 12.)*

or

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NASA Headquarters
Washington, D.C. 20546
(202) 358-1518

Center Educational Programs Officers (CEPOs)

Each Field Center employs a Center Educational Programs Officer to assist in implementing NASA Headquarters programs and services, as well as programs and services specific to the particular Field Center. For more information, contact the CEPO for the appropriate geographic area from the list on the right.

Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming

Chief, Educational Programs Branch
Mail Stop TO-25
NASA Ames Research Center
Moffett Field, CA 94035
(415) 604-5543

Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont

Chief, Educational Programs
Public Affairs Office (130)
NASA Goddard Space Flight Center
Greenbelt, MD 20771
(301) 286-7207

Colorado, Kansas, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas

Center Education Programs Officer
Public Affairs Office (AP-4)
NASA Johnson Space Center
Houston, TX 77058
(713) 483-1257

Florida, Georgia, Puerto Rico, Virgin Islands

Chief, Education and Awareness Branch
Mail Code PA-EAB
NASA Kennedy Space Center
Kennedy Space Center, FL 32899
(407) 867-4444

Kentucky, North Carolina, South Carolina, Virginia, West Virginia

Head, Office of Education Programs
Mail Stop 400
NASA Langley Research Center
Hampton, VA 23681
(804) 864-3312

Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin

Chief, Educational Services Office
Mail Stop 7-4
NASA Lewis Research Center
21000 Brookpark Rd.
Cleveland, OH 44135
(216) 433-5583

Teachers conduct science investigations during a NASA education conference.

Alabama, Arkansas, Iowa, Louisiana, Missouri, Tennessee

Public Services and
Education Branch
Code CA 21
NASA Marshall Space Flight
Center, AL 35812
(205) 544-0213

Mississippi

Manager, Educational
Programs
Mail Stop HA00
NASA Stennis Space Center
Stennis Space Center,
MS 39529
(601) 688-1107

The Jet Propulsion Laboratory serves inquiries related to space and planetary exploration and other JPL activities.

Manager, Educational Affairs
Office
Mail Code 180-205
NASA Jet Propulsion
Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109
(818) 354-6916

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Higher Education Programs

NASA's programs at the collegiate level feature active participation in NASA research, undergraduate and graduate student financial support, and faculty preparation and enhancement activities.

NASA graduate student performing research at a Federal laboratory.

HIGHER EDUCATION PROGRAMS

The higher education programs and services are created for faculty, graduate and undergraduate students, colleges and universities, and other organizations with an interest in aeronautics and space science research, education, and related public service. NASA's programs at the collegiate level feature active participation in NASA research, undergraduate and graduate student financial support, and faculty preparation and enhancement activities. While most of the programs and services included in this section are managed by this branch, some programs are joint efforts with organizations within and outside of NASA. Where appropriate, these organizations are listed as the primary source for more information.

Student Programs

NASA's Cooperative Education (Co-op) Program

NASA's Cooperative Education (Co-op) Program's objectives are (1) to combine academic studies with on-the-job training and experience; (2) to provide exposure to career options and the work performed by NASA; and (3) to give students an opportunity to work at a NASA Field Center while completing their education.

The Co-op Program's work schedules are flexible and correspond with semesters, quarters or trimesters. Students generally alternate periods of work with school, but assignments may not be confined to summers or vacation periods. Graduates are eligible for conversion to permanent employees after they satisfactorily complete educational and work requirements.

Students interested in participating in the Co-op Program should first contact their school's career placement or co-op office to determine if their school has a co-op agreement with a NASA Field Center. Each NASA Field Center manages its own program. If the school does not have an agreement, the school's representative should contact the Cooperative Education Program Coordinator at the Field Center(s) of interest.

For more information, contact:

NASA Headquarters
Code FPH
Washington, D.C. 20546
(202) 358-1570

NASA's Cooperative Education Program participants alternate work periods with school, and are eligible to become permanent NASA employees on completion of work and studies.

The Graduate Student Researchers Program (GSRP)

The objective of the Graduate Student Researchers Program (GSRP) is to help meet the continuing needs of the aeronautics and space effort by significantly increasing the number of highly trained scientists and engineers in aeronautics, space science, space applications and space technology.

Created in 1980, GSRP cultivates additional research ties with the academic community through the award of fellowships to promising students in the science and engineering disciplines. Each year, new award recipients, whose research interests are compatible with NASA's existing programs in space science and aerospace technology, are selected for participation. Awards are based on competitive evaluation of academic qualifications, the proposed research plan and/or plan of study and the applicant's planned utilization of NASA research facilities.

The GSRP matches a student's area of research interest with existing work being carried out at NASA Headquarters or at NASA Field Centers. Awards in astrophysics, communications and information systems, Earth sciences, life sciences, solar system exploration, space physics and microgravity science are sponsored by various NASA program offices. Students who receive an award through these science program offices carry out research or a plan of study at their home university and attend an annual symposium in Washington, D.C. The symposium gives GSRP fellows an opportunity to exchange ideas, discuss progress and learn more about NASA's space science programs.

The remaining awards are distributed through NASA's Field Centers, each of which has specific research programs and facilities. Students who receive an award through a Field Center spend a period of time in residence at the Center, and an applicant's proposed use of a Center's expertise and facilities plays an important role in the selection process.

U.S. citizens who are full-time graduate students and have been accepted as graduate students at an accredited U.S. college or university are eligible.

One-year fellowships, renewable for up to three years, provide $22,000* per year. Interested students are encouraged to obtain the program brochure for detailed information about current research opportunities and application procedures. The application deadline is February 1 with award notification in late April.

For more information, contact:

Higher Education Branch
Education Division
Mail Code FEH
NASA Headquarters
Washington, D.C. 20546
(202) 358-1531

or

Office of Space Science
Code S
NASA Headquarters
Washington, D.C. 20546
(202) 358-0734

or

The University Affairs Officer at the Field Center serving the school's geographic area
(See page 25.)

* Award amounts reflect the 1993 program year. These provisions are subject to change, and it is recommended that those interested contact the appropriate office for the most recent figures.

GSRP Underrepresented Minority Focus (UMF)

In 1987, GSRP was expanded to include the Underrepresented Minority Focus (UMF) component, which was created to increase minority participation in graduate study and research and subsequently in aeronautics, space science, and technology careers. (An underrepresented minority group is one whose members are not represented in science and engineering fields in proportion to their numbers in the general population. The following minorities fall into this category: African Americans, American Indians, Hispanics and Pacific Islanders, as well as individuals with a disability that limits a major life activity.)

Students selected for participation in the GSRP UMF collaborate with university investigators and NASA personnel, either at Headquarters or at a Field Center. U.S. citizens who are full-time students at an accredited U.S. college or university and are members of minority groups are eligible.

Interested students are encouraged to obtain the program booklet and apply by February 1 of each year. Award notification is in late April.

One-year fellowships, renewable for up to three years, provide $22,000* per year.

For more information, contact:

Minority University Research and Education Division
Mail Code EU
NASA Headquarters
Washington, D.C. 20546
(202) 358-0935

or

The University Affairs Officer at the Field Center serving the school's geographic area (See page 25.)

* Award amounts reflect the 1993 program year. These provisions are subject to change, and it is recommended that those interested contact the appropriate office for the most recent figures.

Fellowships offered by this program provide opportunities for members of underrepresented groups.

Global Change Research Graduate Student Fellowship Program

The objective of this program is to train the next generation of Earth scientists and engineers to manage data and information generated by the Earth Observing System (EOS), a part of NASA's Global Change Research Program.

The EOS program is NASA's series of space platforms that will contain instruments designed to study the interaction of the Earth's biological, hydrological, geological and chemical systems and the effects of these interactions on the environment.

Students selected for participation conduct research on climate and hydrologic systems, ecological systems and dynamics, biogeochemical dynamics, solid Earth processes and solar influences. Atmospheric chemistry and physics, ocean biology and physics, ecosystem dynamics, hydrology, cryospheric processes, geology and geophysics are all acceptable areas of research as long as a specific research topic is relevant to NASA's global change research efforts.

Full-time graduate students and seniors who have been accepted into a Ph.D. program at an accredited U.S. college or university are eligible.

Interested students are encouraged to obtain the program brochure for detailed information about current research opportunities. The application deadline is April 1 with award notification on June 30.

One-year fellowships, renewable for up to three years, have a stipend of $20,000,* with $2,000* available by request for the faculty advisor's use in support of the student's research.

Fellowships for both graduate and undergraduate students are also awarded by Space Grant Colleges and Consortia as part of the National Space Grant College and Fellowship Program. For more information, see page 23.

For more information, contact:

Office of Mission to Planet Earth
Code Y
NASA Headquarters
Washington, D.C. 20546
(202) 358-2559

* Award amounts reflect the 1993 program year. These provisions are subject to change, and it is recommended that those interested contact the appropriate office for the most recent figures.

Faculty/Postdoctoral Programs

Summer Faculty Fellowship Program

The objectives of this fellowship program are (1) to further the professional knowledge of engineering and science faculty; (2) to stimulate an exchange of ideas between university faculty and NASA scientists and engineers; (3) to enrich the research and teaching activities of participants' institutions; and (4) to contribute to the ongoing research objectives at NASA facilities.

NASA, in cooperation with the American Society for Engineering Education (ASEE), awards summer fellowships to engineering and/or science educators. Those selected for participation receive a stipend and spend 10 or 11 weeks working at a NASA Field Center on aeronautics or space research. Specific research varies among Field Centers and is supplemented with enrichment activities, such as short courses, workshops or seminars.

U.S. citizens with teaching or research appointments in universities or colleges and who, preferably, have a minimum of two years of experience, are eligible.

Interested persons are encouraged to obtain the program brochure for current research opportunities. The application deadline is January 15 with award notification on March 1 of each year.

Each award provides $1,000* per week, plus travel expenses and a $1,000* relocation allowance. Second summer participation is by invitation.

For more information, contact:

American Society for Engineering Education
11 Dupont Circle, N.W.
Suite 200
Washington, D.C. 20036
(202) 986-8525

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* Award amounts reflect the 1993 program year. These provisions are subject to change, and it is recommended that those interested contact the appropriate office for the most recent figures.

Resident Research Associateship Program

The objectives of this program are (1) to provide outstanding postdoctoral scientists and engineers an opportunity to perform research at participating NASA Field Centers and (2) to contribute to NASA's research base.

Administered for NASA by the National Research Council (NRC), the program consists of two types of associateships: (1) Regular Research Associateships, which are initially awarded for one year to those who have held a doctorate for less than five years; and (2) Senior Research Associateships, which are initially awarded for one year to those who have held a doctorate for more than five years. Both types of associateships may be renewed for a second year, and awards for less than a year may be considered for Senior Research Associates.

Those selected for participation must be in residence at the sponsoring Field Center during the entire period of the associateship. Associates have the status of visiting scientists or engineers during their period of tenure.

For eligibility, applicants must be U.S. citizens or non-U.S. citizens (in basic science areas only) who have full command of the English language. (Either an Exchange Visitor or Immigrant [Permanent Resident] visa is required before tenure may begin.) Awardees must hold the Ph.D., Sc.D. or other earned research doctoral degree recognized as equivalent to the Ph.D. or must present acceptable evidence of having completed all the formal academic requirements for one of these degrees before tenure can begin. Applicants must also demonstrate superior ability for creative research.

Applications are reviewed three times a year, in February, June, and October. Application deadlines are December 15, April 15, and August 15, respectively.

Regular Associateships begin at $34,500* per year; Senior Associateships are appropriately higher and are based on professional experience and accomplishments. Those in the fields of engineering, computer science and medical science (M.D.) receive an additional $6,500.* In addition, Associates receive a relocation and professional travel allowance.

For more information, contact:

National Research Council
GR 430
2101 Constitution Ave., N.W.
Washington, D.C. 20418
(202) 334-2760

* Award amounts reflect the 1993 program year. These provisions are subject to change, and it is recommended that those interested contact the appropriate office for the most recent figures.

Participants in the Summer Faculty Fellowship Program receive a stipend and spend 10 or 11 weeks working at a NASA Field Center.

Institutional Programs

NASA/USRA Advanced Design Program

The objectives of this program are (1) to enrich university engineering design curricula and improve the overall educational capability in advanced aeronautics and space science design; (2) to develop a network of universities with expertise in engineering systems design which will have the capacity to contribute to NASA's future mission concepts; (3) to strengthen ties between NASA Centers and university engineering departments; (4) to introduce real NASA and industry projects into university engineering programs, and (5) to stimulate interest for students in graduate work and/or employment in aeronautics and space fields.

Managed for NASA by the Universities Space Research Association (USRA), Advanced Design awards grants to universities to support incorporation of advanced aeronautics or space mission topics in their senior engineering design courses. While the program was originally conceived for use in the engineering discipline, it has since been expanded to include students from other disciplines and can involve cross-disciplinary design projects where appropriate.

The study topics cover a broad range of potential space and aeronautics projects that could be undertaken during a 20-30 year period beginning with the deployment of Space Station. Both manned and unmanned endeavors are embraced, and the systems approach to the design problem is emphasized.

Design projects are chosen in consultation with a NASA Field Center. Throughout the period of the design project, the Center provides technical expertise as needed. A portion of the grant is specifically targeted for the hiring of a teaching assistant, who may subsequently be awarded a summer work assignment at a Field Center. The program culminates each year with a summer conference at which students present their completed design projects to NASA managers, aerospace industry representatives and other participating universities.

U.S. universities with an accredited aeronautics or aerospace engineering department or equivalent may apply.

The announcement of opportunity is issued by the University Space Research Association every three years.

For more information, contact:

University Space Research Association
NASA/USRA Advanced Design Program
3600 Bay Area Blvd.
Houston, TX 77058
(713) 244-2000

or

Higher Education Branch
Education Division
Code FEH
NASA Headquarters
Washington, D.C. 20546
(202) 358-1531

National Space Grant College and Fellowship Program

The objectives of this program are (1) to establish a national network of universities with interests and capabilities in aeronautics, space and related fields; (2) to encourage cooperative programs among universities, aerospace industry and Federal, State and local governments; (3) to encourage interdisciplinary training, research, and public service programs related to aerospace; (4) to recruit and train professionals, especially women, underrepresented minorities and persons with disabilities, for careers in aerospace science and technology; and (5) to promote a strong science, mathematics and technology education base from elementary through university levels.

Authorized by Congress in 1987, the National Space Grant College and Fellowship Program was conceived as a means of developing a national academic network with expanded and enhanced abilities to respond to both present and future aerospace needs.

The centerpiece of the program is State consortia, composed of colleges and universities, industry, and other organizations and institutions with interests in aeronautics and space education, research and public service. Each consortium receives an annual grant, a portion of which is reserved for fellowships for promising undergraduate and graduate students. The remaining funds, which must be matched by funds from other sources, are to be used for programs that build research infrastructure, develop or revise engineering and science curricula and offer precollege activities designed to stimulate interest in science, mathematics and technology.

For more information, contact:

Higher Education Branch
Education Division
Code FEH
NASA Headquarters
Washington, D.C. 20546
(202) 358-1531

The awarding of scholarships and fellowships is an important part of the National Space Grant College and Fellowship Program.

Federal Information Exchange, Inc. (FEDIX)

NASA participates, along with other Federal agencies, in the Federal Information Exchange, Inc., an online system that provides information on government research and education programs. FEDIX has proven to be an effective means of facilitating research, education and public services by providing the higher education community with rapid, efficient access to current programs and research opportunities.

FEDIX may be accessed via standard telephone lines by anyone with a microcomputer, a 1200 or 2400 baud modem and communications software. There are no registration fees and no access charges for using this system. The only cost incurred may be that of a long distance phone call.

FEDIX provides information on:

- Federal government education and research and development programs
- education and/or research-related agency contacts
- scholarships, fellowships and grants
- new funding for research and educational activities from the *Commerce Business Daily, Federal Register* and other sources
- agency history, budget, organizational structure and mission statements
- current events within participating agencies

FEDIX operates 24 hours a day, 7 days a week. For those with experience communicating with on-line systems, modem settings are: no parity, 8 bits and 1 stop bit. New users are encouraged to obtain the FEDIX User's Guide, which contains detailed information on how to get started and how to navigate the system.

FEDIX On-line:
1-(800) 783-3349

FEDIX Helpline:
(301) 975-0103

Internert
FEDIX•FIE•comm

For more information, contact:

Federal Information Exchange, Inc.
555 Quince Orchard Rd.
Suite 200
Gaithersburg, MD 20878
(301) 975-0103

A variety of information on Federal agency research and training activities is available 24 hours a day on FEDIX.

The NASA Field Center Network

Each of NASA's nine Field Centers participates in NASA's education mission in two ways: (1) by administering the Center's segment of the programs and services listed in this brochure and (2) by offering additional programs and services to meet local research and operational needs.

Each Field Center plays a specific role in carrying out NASA's research and development mission, with additional university programs conducted to meet local or regional needs. A University Affairs Officer at each Field Center serves as a first point of contact for information about ongoing research opportunities and other university-related activities. For more information about university programs, contact the University Affairs Officer at the appropriate Field Center:

Chief, Higher Education Branch
Education Division
Mail Code FEH
NASA Headquarters
Washington, D.C. 20546
(202) 358-1531

University Affairs Officer
Code 241-1
NASA Ames Research Center
Moffett Field, CA 94035
(415) 604-5624

University Affairs Officer
Mail Stop 160
NASA Goddard Space Flight Center
Greenbelt, MD 20771
(301) 286-9690

University Affairs Officer
Mail Code 183-900
NASA Jet Propulsion Laboratory
4800 Oak Grove Dr.
Pasadena, CA 91109
(818) 354-8251

University Affairs Officer
Mail Stop AHU
NASA Johnson Space Center
Houston, TX 77058
(713) 483-4724

University Affairs Officer
Mail Code PT-PAS
NASA Kennedy Space Center
KSC, FL 32899
(407) 867-7952

University Affairs Officer
Mail Stop 105-A
NASA Langley Research Center
Hampton, VA 23681
(804) 864-6058

University Affairs Officer
Mail Stop CP-1
NASA Lewis Research Center
21000 Brookpark Rd.
Cleveland, OH 44135
(216) 433-2956

University Affairs Officer
Mail Stop DS01
NASA Marshall Space Flight Center
MSFC, AL 35812
(205) 544-0997

University Affairs Officer
Science & Technology Branch
NASA Stennis Space Center
SSC, MS 39529
(601) 688-3830

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Technologies enhance

instructional capabilities,

provide broader dissemi-

nation of information and

advance the communication

of knowledge.

Technology and Evaluation Programs

Students develop interest in technology through NASA's "hands-on" experiences.

NASA's technology program evaluates advanced information and communications technologies and develops programs and services that use the most effective of these technologies. Technologies that are either currently being utilized or are in the research, development, and evaluation phase include satellite communications systems, computer-assisted instruction (CAI), laser videodisc, CD-ROMs, multi-media, and computer communications networks. Technologies enhance instructional capabilities, provide broader dissemination of information and advance the communication of knowledge. A classroom demonstration site, *The Classroom of the Future*, is used for research and development of educational technologies for aerospace education.

In addition, a number of educational programs and activities under the "Teaching from Space" theme build upon the goals of the original Teacher in-Space Program and incorporate a wide variety of programs and materials. The "Teaching from Space" programs and materials are developed in cooperation with the science Program Offices, the Johnson Space Center Education Working Group and NASA Field Center education initiatives related to NASA missions.

Teaching from Space

Teaching from Space embraces, and expands upon, the goals of the original Teacher-in-Space Program: (1) to increase the prestige of the teaching profession; (2) to increase awareness in the education community of the impact of science, mathematics, and technology on this country's future; and (3) to use aerospace as a catalyst to enhance all subject areas and grade levels of our education system.

The Teacher-in-Space Program is focused on a specific mission—flying a teacher on a Space Shuttle mission. "Teaching from Space" uses that unique perspective to initiate a program of actively involving the education community in aeronautics and space science research through participatory experiences. Students and teachers participate in the aerospace program through opportunities such as:

- Projects related to Mission to Planet Earth, including ground truth studies and APT (Automatic Picture Transmission) analysis of real-time satellite data.
- Communications with the Shuttle made possible by such projects as the Shuttle Amateur Radio Experiment (SAREX).
- National research projects similar to the Space Exposed Experiment Developed for Students (SEEDS).

These programs will set the stage for education initiatives from NASA's future exploration missions. Students and teachers will be involved in the aerospace program every step of the way, and therefore, will feel ownership of their future beyond Earth's boundaries.

Currently, "Teaching from Space" focuses on four areas:

1. The Teacher-in-Space Program.
2. Projects under development with the NASA Johnson Space Center Education Working Group.
3. NASA Field Centers' education initiatives related to NASA missions.
4. Projects under development with the NASA Offices of Space Science, Mission to Planet Earth, Life & Microgravity Sciences and Applications, and Space Flight.

NASA Teacher Resource Center (TRCN) Network

Dissemination of Instructional Products

The NASA Education Division disseminates educational products and materials for teachers of all grade levels through the NASA Centers, the Teacher Resource Center Network (TRCN), NASA Select, and NASA Spacelink. The TCRN is the distribution system that provides NASA's instructional materials and program information to educators across the nation. NASA Spacelink complements the TRCN by using an electronic information system to further distribute a wide range of information for educators, whereas NASA Select transmits videotapes and education programs via satellite.

NASA Teacher Resource Center Network

Teachers can enhance their existing curriculum through information generated by NASA programs, technologies, and discoveries. NASA educational materials provide curriculum supplements for mathematics, science, and technology. Integration of all subjects is applied as appropriate.

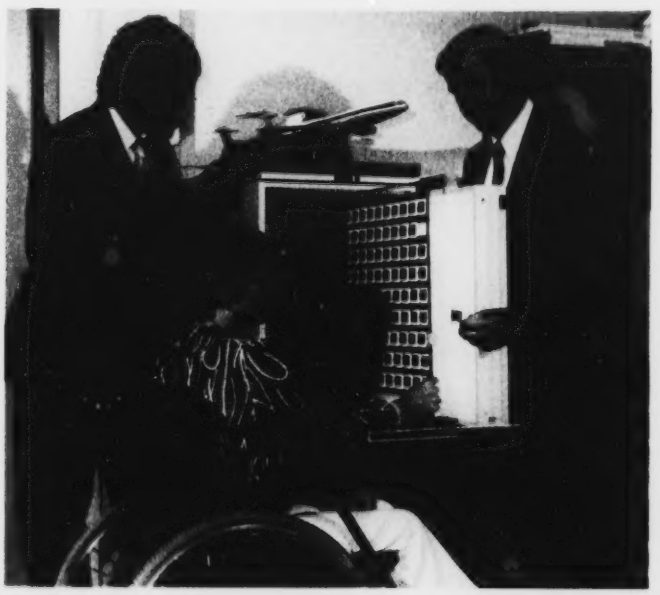
To help disseminate these materials to elementary educators, secondary educators, and higher education faculty, the NASA Education Division has established the NASA Teacher Resource Center Network (TRCN). The TRCN is composed of Teacher Resource Centers (TRCs), Regional TRCs (RTRCs), and the NASA Central Operation of Resources for Educators (CORE). The TRCs and RTRCs are the principal distribution points where educators may copy NASA text, audio, visual, and computer materials. CORE processes U.S. and international educator requests by mail.

Teacher Resource Centers

TRCs are located near or on NASA Field Centers, and they offer a variety of NASA-related educational materials in several formats: videotapes, slides, audio tapes, and publications including teacher guide with activities. A list of TRCs starts on page 42.

Regional Teacher Resource Centers

To offer more educators the opportunity to visit the TRCN, NASA forms partnerships with school systems, universities, museums, and other nonprofit organizations to serve as RTRCs. Teachers may preview, copy or receive NASA materials at these sites. A list of RTRCs begins on page 43.



Educators access audiovisual and printed material in NASA Teacher Resouce Centers.

Central Operation of Resources for Educators (CORE)

CORE was designed for the national and international distribution of NASA educational audiovisual materials.

CORE is a nonprofit institution which mails audiovisual materials at cost, plus shipping and handling, to U.S. and to international educators. An educator may request a catalogue and an order form from CORE by writing on school letterhead or by telephoning.

For more information, contact:

NASA CORE
Lorain County Joint Vocational School
15181 Route 58 South
Oberlin, OH 44074
(216) 774-1051, Ext. 293/294

NASA Spacelink

NASA Spacelink is an electronic information system containing current NASA educational services, classroom materials, instructional activities, and space program spinoffs, NASA news, information and reference data on aeronautics and space exploration, and NASA Field Center activities.

NASA Spacelink Direct Dial:
(205) 895-0028

Internet Address:
192.149.89.61

For more information, contact:

NASA Spacelink
Administrator
Marshall Space Flight Center
Mail Code CA-21
Huntsville, AL 35807
(205) 544-6527

NASA Select

Established in the early 1980s, NASA Select Television offers the general public a front-row seat at mission launches and activities taking place in space during a mission, as well as informational and educational programming, historical documentaries, and updates on the latest developments in aeronautics and space science.

Programming on NASA Select begins at 12:00 noon EDT, Monday through Friday, and is shown in four-hour blocks that are repeated at 4:00 pm, 8:00 pm and midnight. Although all programming has historical and educational value, the 2:00 pm, 6:00 pm, 10:00 pm and 2:00 am programming is designated as containing educational material suitable for classroom use.

For more information, contact:

Technology and Evaluation Branch
Education Division
Code FET
NASA Headquarters
Washington, D.C. 20546
(202) 358-1540

Satellite Videoconferences and professional development programs for educators are available on NASA Select.

Satellite Video-Conferences

The *NASA Education* Satellite Videoconference Series for Teachers is a series of professional development programs for educators. Its objectives are (1) to inform teachers about current developments in America's aeronautics and space programs and (2) to demonstrate techniques to teachers for instructing students about aerospace concepts. By upgrading educators' skills in these areas, NASA is working to help teachers enhance instruction by providing new information and materials while also providing faculty with resources to capture students' interest in science, mathematics and technology.

Components of the videoconference series include:

- a presentation by a NASA astronaut, project scientist, or program administrator;
- an update on current NASA educational products, services, and programs;
- a demonstration of teaching activities and strategies;
- the provision of printed materials relevant to the topic;
- a status report on NASA projects and Space Shuttle launches; and
- an opportunity to interact with the speakers.

The videoconference series is free to registered educational institutions. To participate, institutions must have a C-band satellite receiving system, teacher release time, and an optional long distance telephone line for interaction. The programs may be videotaped and copied for later use.

For more information, contact:

Videoconference Coordinator
NASA Aerospace Education Services Program
Oklahoma State University
300 N. Cordell
Stillwater, OK 74078
(405) 744-7015

Computer Software

Several needed enhancements in the availability of software have been identified by NASA's review of computer programs for aerospace education. Instructional enhancements through computer-assisted instruction packages, simulations and databases are being developed. Programs related to astronomy, graphics files and various reference databases are also among the items being developed.

The software development capability is being enhanced through *The Classroom of the Future* project, which is expected to result in a greater number of available titles. Many software packages are available for download via NASA Spacelink.

For more information, contact:

Technology and Evaluation Branch
Education Division
Code FET
NASA Headquarters
Washington, D.C. 20546
(202) 358-1540

Teacher-in-Space Designee Barbara Morgan works with students on a software package available through NASA Spacelink.

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Bibliography of Software for Aerospace Education

NASA has compiled an extensive bibliography of computer software for aerospace education at the elementary and secondary levels. This bibliography includes both commercial and public domain programs and includes laser videodisc packages, as well as microcomputer software.

Descriptive information and ordering data are included in this reference publication. Information of special use to teachers includes subject matter classifications, grade level, cost, and computer system requirements.

The Bibliography of Software for Aerospace Education will be kept current through annual updates and periodic new editions.

For more information:

Teacher Resource Centers *(See page 42.)*

or

Regional Teacher Resource Centers *(See page 43.)*

or

NASA Spacelink Direct Dial: (205) 895-0028

or

Internet Address: 192.149.89.61

Teacher-in-Space Program

On August 27, 1984, President Reagan launched NASA's Teacher-in-Space Program with the announcement that a teacher would be selected to fly on a Space Shuttle. NASA managed this effort as part of its Space Flight Participant Program, which was created to allow private citizens to fly on the Shuttle and communicate their experience with the public.

The Council of Chief State School Officers coordinated the selection of a teacher. Applications came from more than 11,000 teachers in the 50 states, the District of Columbia, U.S. territories, Department of Defense Dependent Schools, Department of State Overseas schools and Bureau of Indian Affairs schools.

From 114 state nominees selected and designated as Space Ambassadors, 10 finalists were chosen. On July 19, 1985, Christa McAuliffe and Barbara Morgan were selected as the primary and backup candidates, respectively.

Both received extensive training at Johnson Space Center in preparation for a flight.

After the Challenger accident and in the following months, NASA was deluged with thousands of letters and phone calls of support from both teachers and students.

Meanwhile, after meetings with leaders of educational associations and the Space Ambassadors, NASA officials announced that the educational programs developed in conjunction with the Teacher-in-Space Program would continue. The Space Ambassadors, through their continuing support, were especially helpful during this period as role model, motivational, and instructional resources.

The Space Ambassadors formed the Teacher-in-Space Education Foundation (TISEF), which then merged with the Challenger Center for Space Science Education.

See page 52 for information on the educational activities sponsored by the Challenger Center.

Barbara Morgan maintains a leadership role in the program as the Teacher-in-Space Designee. She teaches in Idaho and continues to work with NASA's Education Division.

For more information, contact:

Challenger Center for Space Science Education
1055 North Fairfax Street, Suite 100
Alexandria, VA 22314
(703) 683-9740

or

Technology and Evaluation Branch
Education Division
Code FET
NASA Headquarters
Washington, D.C. 20546
(202) 358-1540

Programs Developed in Cooperation with the Johnson Space Center Education Working Group

In cooperation with the Education Working Group at NASA Johnson Space Center, a series of Space Shuttle mission-specific educational publications and videotapes are produced. These materials are developed in coordination with the NASA Program Offices.

Liftoff to Learning Video Series

In cooperation with the Astronaut Corps and NASA Program Offices, a series of educational videos related to space flight and scientific and technical concepts of interest to educators and students at all levels is produced. The first six videos of the Liftoff to Learning video series includes *Space Basics, Go For EVA, Newton's Laws, All Systems Go, The Voyage of Endeavour Then & Now*, and *The Atmosphere Below*. All videos are accompanied by a resource guide with educational text and classroom activities related to the mission.

The *Liftoff to Learning* Video Series is available for copying at Teacher Resource Centers and Regional Teacher Resource Centers or may be taped via NASA Select. *The Resource Guide*, for each video in this series, may also be downloaded via NASA Spacelink.

Mission Highlights

Mission Highlights is distributed after a mission and describes the accomplishments of the mission. Each *Mission Highlights* also contains a "Mission Facts" section, which is presented in chart form and is useful as a quick reference guide, as well as short biographies of each crew member. If activities with special emphasis on education take place during a mission, these activities are also available from NASA Spacelink.

For more information, contact:

Teacher Resource Centers *(See page 42.)*

or

Regional Teacher Resource Centers *(See page 43.)*

or

NASA Spacelink Direct Dial: (205) 895-0028

or

Internet Address: 192.149.89.61

Astronauts take part in developing educational videotapes in coordination with NASA's Education Division and Program Offices.

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Shuttle Amateur Radio Experiment (SAREX)

With the help of Amateur Radio clubs and ham radio operators, astronauts on designated shuttle flights, make radio contacts while in orbit. This activity is done through the Shuttle Amateur Radio Experiment (SAREX). The astronauts talk directly with teachers, parents and communities. By using Amateur Radio during the Shuttle mission, astronauts share the excitement of learning with people around the world.

The American Radio Relay League (ARRL), the Radio Amateur Satellite Corporation (AMSAT) and NASA's Education Division sponsor this shuttle experiment, with AMSAT heading up technical operations. Hundreds of Amateur Radio operators work behind the scenes, including those from NASA's Amateur Radio clubs at the Field Centers. The ARRL can provide educators with lesson plans and resource materials.

For more information, contact:

American Radio Relay League (ARRL)
225 Main St.
Newington, CT 06111
(203) 666-1541

or

Technology and Evaluation Branch
Education Division
Code FET
NASA Headquarters
Washington, D.C. 20546
(202) 358-1540

A student talks with STS-47 astronauts as part of the SAREX program.

Education Programs and Products Developed in Cooperation with Science Program Offices

Space science offers exciting content and unique applications to education programs and activities. The space science community, in collaboration with the Education Division, is developing instructional materials and conducting education outreach programs to compliment NASA's scientific mission.

The Offices of Space Science, Mission to Planet Earth, and Life and Microgravity Sciences and Applications, provide technical content for educational programs specific to those disciplines. Agency-wide education policy and educational program management guidance on the educational value, feasibility, and usefulness of mission-specific educational projects is provided to the Program Offices by the Education Division.

Information on specific programs and products is available in the OSSA/Office of Human Resources and Education Catalog of Space Science and Applications Education Programs and Activities, *Looking to the Future* and the NASA Mission to Planet Earth Catalog of Education Programs and Activities.

For more information, contact:

Technology and Evaluation Branch
Education Division
Code FET
NASA Headquarters
Washington, D.C. 20546
(202) 358-1540

Text of the catalog is also available on NASA Spacelink.

NASA University Program Management Information System (MIS)

The NASA University Program Management Information System contains information on grants and contracts with colleges and universities. An annual publication of the data in this system is formatted by state, institution and grant/contract number. The period of performance, a brief project description and the names of the principal investigators and NASA technical monitors are also included.

For more information, contact:

Technology and Evaluation Branch
Education Division
Code FET
NASA Headquarters
Washington, DC 20540
(202) 358-1540

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Educational Publications

NASA's Educational Publications are produced and disseminated to the educational community in a variety of formats in both the printed and electronic media.

NASA distributes educational publications at professional conferences.

EDUCATIONAL PUBLICATIONS

NASA's educational publications are produced and disseminated to the educational community in a variety of formats in both the printed and electronic media. Many of these resources are available through the Teacher Resource Network, via NASA Spacelink, and directly from NASA Headquarters.

Educational Publications

Throughout the year, NASA's educational publications are written, edited, illustrated, designed, laid out, printed and distributed. These services result in a variety of publications targeted toward specific segments of the educational community: elementary, intermediate, high school and university students and teachers, and the general public. The publications produced can be divided into eight categories:

1. **The newsletter, *Educational Horizons***, is NASA's triannual publication for educators. Each issue features information about upcoming Shuttle missions, updates on space science and aeronautics research, and information about NASA's Education Program. The newsletter is free by subscription to educators and announces the latest educational publications available from NASA.

2. **Teaching and Video Resource Guides** provide materials that allow educators to incorporate aerospace related topics into existing curriculum. Each Teaching Guide is targeted to specific grade levels and discusses a primary topic. Each guide includes classroom activities and a special resource section that provides information on where to obtain materials that can be used to enhance classroom activities.

   Video Resource Guides consist of a videotape and accompanying resource guide, each on a specific topic. Included in this category are single-video topics, as well as topics that are covered in a series of videos, such as the Liftoff-to-Learning Video Series. See page 33 for a full description of this series. Additional listings of videos are available From CORE (page 43).

3. **Educational Briefs** provide educators with rapid access to information about NASA's current activities and aerospace missions, as well as the results of these activities, in a concise format.

   Educational Briefs are targeted toward the educator with practical applications for the classroom. A typical Educational Brief covers a specific topic, and where the subject matter is appropriate for use at more than one level, a series of briefs may be produced.

   Educational Briefs maintain a consistent format. Each brief first discusses a specific topic or mission, followed by suggested classroom activities and a bibliography of other publications available either from NASA or from other sources.

4. **Educational Publications** are more detailed publications that discuss a mission or program in greater depth than an Educational Brief. Publications vary in size, length, format and target audience, depending on the topic and its application to a specific segment of the educational

community. Examples of the topics covered in this type of publication include the Earth Observing System, the Hubble Space Telescope and the Space Shuttle.

5. **NASA Facts** are brief, concise documents designed to explain certain discipline areas by connecting aeronautics and space science concepts with those taught in the classroom. They cover a single topic, and are targeted at the general public, as well as the educational community.

6. **Pamphlets** produced by this branch fall into two categories: general pamphlets, which include magazine article reprints, bibliographies and career information, all in a variety of formats and subject areas; and educational pamphlets, which include references to Teacher Resource Centers and other NASA education services and programs.

7. **Lithographs** are 8-inch by 10-inch publications that include a photograph or image on the front and text on the reverse side. An example of the subject matter appropriate for this type of publication is the Space Shuttle *Endeavour*. The lithograph for this topic has a photo of *Endeavour* on the front and a brief description, followed by related research topics for the classroom and suggested classroom activities on the back.

8. **Wallsheets** are large, full-color posters appropriate for mounting in the classroom. As with lithographs, some wallsheets may incorporate text that further describes a photo or image; others provide background information or information on related subjects, all appropriate for use in the classroom.

For more information, contact:

Teacher Resource Centers *(See page 42)*

or

Regional Teacher Resource Centers *(See page 43)*

or

NASA Spacelink Direct Dial (205) 895-0028

NASA educational publications provide valuable teaching tools for educators.

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NASA education

resources and partnerships

with aerospace organizations

provide educators with a

wide range of materials

and opportunities.

Students apply science, mathematics, and technology through "hands-on" activities with NASA education programs.

NASA education resources and partnerships with aerospace orginizations provide educators with a wide range of materials and opportunities. This reference contains information on resources that are of value in an educational setting, including some from earlier sections of this brochure, making this section useful as a quick reference source for resources applicable to education at all levels.

For ease of use, NASA resources are listed first, followed by resources and programs that are made available from other organizations.

NASA Resources

Teacher Resource Centers (TRCs):

To make information available to the educational community, the Education Division has created the NASA Teacher Resource Center Network. Teacher Resource Centers (TRC's) contain a wealth of information for educators: publications, reference books, slides, audio cassettes, videocassettes, telelecture programs, computer programs, lesson plans and activities, and lists of publications available from government and nongovernment sources. Because each NASA Field Center has its own areas of expertise, no two TRC's are exactly alike. Phone calls are welcome if you are unable to visit the TRC that serves your geographic area.

Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming

NASA Ames Research Center
Teacher Resource Center
Mail Stop TO-25
Moffett Field, CA 94035-1000
(415) 604-3574

California
(Mainly cities near Dryden Flight Research Facility)

NASA Dryden Flight Research Facility
Public Affairs Office (Trl. 42)
Teacher Resource Center
Edwards AFB, CA 93523
(805) 258-3456

Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont

NASA Goddard Space Flight Center
Teacher Resource Laboratory
Mail Code 130.3
Greenbelt, MD 20771
(301) 286-8570

Maryland and Virginia's Eastern Shores

Wallops Flight Facility
Education Complex—Visitor Center
Teacher Resource Center
Bldg. J-17
Wallops Island, VA 23337
(804) 824-2297/2298

Florida, Georgia, Puerto Rico, Virgin Islands

NASA John F. Kennedy Space Center
Educators Resources Laboratory
Mail Code ERL
Kennedy Space Center, FL 32899
(407) 867-4090

Colorado, Kansas, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas

NASA Johnson Space Center
Teacher Resource Center
Mail Code AP-4
Houston, TX 77058
(713) 483-8696

Kentucky, North Carolina, South Carolina, Virginia, West Virginia

NASA Teacher Resource Center
Virginia Air and Space Center
600 Settler's Landing Road
Hampton, VA 23669
(804) 727-0800

Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin

NASA Lewis Research Center
Teacher Resource Center
Mail Stop 8-1
21000 Brookpark Road
Cleveland, OH 44135
(216) 433-2017

Mississippi

NASA Stennis Space Center
Teacher Resource Center
Bldg. 1200
Stennis Space Center, MS 39529
(601) 688-3338

Alabama, Arkansas, Iowa, Louisiana, Missouri, Tennessee

NASA Teacher Resource Center
U.S. Space & Rocket Center
Huntsville, AL 35807
(205) 544-5812

For inquiries related to space science and planetary exploration:

NASA Jet Propulsion Laboratory
Teacher Resource Center
JPL Educational Outreach
4800 Oak Grove Drive
Mail Code CS-530
Pasadena, CA 91109
(818) 354-6916

NASA Central Operation of Resources for Educators (CORE)

CORE was established for the national and international distribution of NASA-produced educational materials in audiovisual format. Submit a written request on your school letterhead for a catalog and order forms. Orders are processed for a small fee that includes the cost of the media, shipping and handling.

For more information, contact:

NASA CORE
Lorain County Joint Vocational School
15181 Route 58 South
Oberlin, OH 44074
Phone: (216) 774-1051
Ext. 293 or 294

Regional Teacher Resource Centers (RTRCs):

Alabama

Tri-State Learning Center
NASA Regional Teacher Resource Center
P.O. Box 508
Iuka, MS 38852-0508
(601) 423-4373

Arizona

Lunar and Planetary Lab
NASA Regional Teacher Resource Center
University of Arizona
Tucson, AZ 85721
(602) 621-6939

Arkansas

University of Arkansas at Little Rock
NASA Regional Teacher Resource Center
Natural Science Bldg., Room 215
2801 South University
Little Rock, AR 72204
(501) 569-3259

Colorado

U.S. Space Foundation
NASA Regional Teacher Resource Center
2860 S. Circle Drive, Suite 2301
Colorado Springs, CO 80906
(719) 516-8000

Delaware

Delaware Teacher Center
Claymont Education Campus
NASA Regional Teacher Resource Center
3401 Green Street
Claymont, DE 19703
(302) 792-3800

District of Columbia, U.S. States and Territories*

National Air and Space Museum
Smithsonian Institution
Education Resource Center, MRC-305
Washington, DC 20560
(202) 786-2109
Air and space exploration inquiries are handled.

District of Columbia

University of the District of Columbia
NASA Regional Teacher Resource Center
Mail Stop 4201
4200 Connecticut Ave. NW
Washington, DC 20008
(202) 282-7338

Georgia

Southern College of Technology/GYSTC
1100 S. Marietta Parkway
Marietta, GA 30060-2898
(404) 528-6272

Hawaii

Barbers Point Elementary School
NASA Regional Teacher Resource Center
Boxer Road
Barbers Point Naval Air Station
EWA Beach, HI 96706
(808) 682-0622

Idaho

University of Idaho at Moscow
NASA Regional Teacher Resource Center
ID Space Grant College Fellowship Program
College of Education
Moscow, ID 83843
(208) 885-6030

Iowa

University of Northern Iowa
NASA Regional Teachers Resource Center
IRTS
Room 222, Schindler Education Center
Cedar Falls, IA 50614-0009
(319) 273-6066

Illinois

Chicago Museum of Science and Industry
NASA Regional Teacher Resource Center
57th Street and Lakeshore Drive
Chicago, IL 60637-2093
(312) 684-1414 Ext. 429

Illinois

Parks College of St. Louis University
NASA Regional Teacher Resource Center
Rt. 157 and Falling Springs Road
Cahokia, IL 62206
(618) 337-7500

Indiana

University of Evansville
NASA Regional Teacher Resource Center
School of Education
1800 Lincoln Avenue
Evansville, IN 47722
(812) 479-2393

Kansas

Kansas Cosmosphere and Space Center
NASA Regional Teacher Resource Center
1100 North Plum
Hutchinson, KS 67501
(316) 662-2305 or
1-800-397-0330

Kentucky

Murray State University
NASA Regional Teacher Resource Center
Waterfield Library
Murray, KY 42071
(502) 762-4420

Louisiana

Bossier Parish Community College
NASA Regional Teacher Resource Center
2719 Airline Drive
Bossier City, LA 71111
(318) 746-7754

Louisiana

Southern University
NASA Regional Teacher Resource Center
Downtown Metro Center
610 Texas Street
Shreveport, LA 71101
(318) 674-3444

Michigan

Central Michigan University
NASA Regional Teacher Resource Center
Ronan Hall, Room 101
Mount Pleasant, MI 48859
(517) 774-4387

Michigan

Northern Michigan University
NASA Regional Teacher
Resource Center
Olson Library Media Center
Marquette, MI 49855
(906) 227-2270

Michigan

Oakland University
NASA Regional Teacher
Resource Center
O'Dowd Hall, Room 216
Rochester, MI 48309-4401
(313) 370-2485

Minnesota

Mankato State University
NASA Regional Teacher
Resource Center
Department of Curriculum
and Instruction
MSU Box 52/P.O. Box 8400
Mankato, MN 56002-8400
(507) 389-5710/1516

Minnesota

St. Cloud State University
NASA Regional Teacher
Resource Center
Center for Information Media
St. Cloud, MN 56301
(612) 255-2062

Mississippi

Tri-State Learning Center
NASA Regional Teacher
Resource Center
P.O. Box 508
Iuka, MS 38852-0508
(601) 423-4373

Mississippi

Mississippi Delta Community
College
NASA Regional Teacher
Resource Center
P.O. Box 177
Moorehead, MS 38761
(601) 246-5631

Montana

Western Montana College of
the University of Montana
NASA Regional Teacher
Resource Center
Carson Library
Dillon, MT 59725
(406) 683-7541

Nebraska

University of Nebraska State
Museum
NASA Regional Teacher
Resource Center
14th & U Streets
307 Morrill Hall
Lincoln, NE 68588-0338
(402) 472-6302

Nebraska

University of Nebraska
at Omaha
NASA Regional Teacher
Resource Center
Mallory Countze Planetarium
Durham Science Center,
Room 144
60th and Dodge Street
Omaha, NE 68182
(402) 544-2510

New Mexico

New Mexico State University
NASA Regional Teacher
Resource Center
New Mexico Space Grant
Consortium
Box 30001, Dept. SG
Las Cruces, NM 88003-0001
(505) 646-6414

New Mexico

University of New Mexico
NASA Regional Teacher
Resource Center
Continuing Education and
Community Service
1634 University NE
Albuquerque, NM
87131-4006
(505) 277-3861

New York

The City College
NASA Regional Teacher
Resource Center
Harris Hall, Room 109
Convent Avenue and 138th
Street
New York, NY 10031
(212) 650-6993/5441

North Carolina

University of North Carolina
– Charlotte
NASA Regional Teacher
Resource Center
J. Murrey Atkins Library
Charlotte, NC 28223
(704) 547-2559

North Dakota

University of North Dakota
NASA Regional Teacher
Resource Center
The Wayne Peterson Room
Earth Systems Science
Building
Space Studies Department
P.O. Box 7306,
University Station
Grand Forks, ND 58202-7306
(701) 777-4856 or
1-800-828-4274

Ohio

University of Cincinnati
NASA Regional Teachers
Resource Center
Curriculum Resource Center
1613 Blegen Library
University of Cincinnati
Cincinnati, OH 45221-0219
(513) 556-4043

Oklahoma

Oklahoma State University
NASA Regional Teachers
Resource Center
300 North Cordell
Stillwater, OK
74078-0422
(405) 744-7015

Pennsylvania

Mid Atlantic Technology
Application Center
NASA Regional Teacher
Resource Center
University of Pittsburgh
823 William Pitt Union
Pittsburgh, PA 15260
(412) 648-7008

Rhode Island

Rhode Island College
NASA Regional Teacher
Resource Center
Curriculum Resources Center
600 Mt. Pleasant Avenue
Providence, RI 02908
(401) 456-8567/8065

South Carolina

Stanback Planetarium
NASA Regional Teacher
Resource Center
P.O. Box 7636
South Carolina State
University
Orangeburg, SC 29117
(803) 536-8711

Tennessee

University of Tennessee at
Martin
NASA Regional Teacher
Resource Center
Center for Excellence in
Mathematics and Science
Martin, TN 38238
(901) 587-7490

Utah

Weber State University
NASA Regional Teacher
Resource Center
Curriculum Library
College of Education
Ogden, UT 84408-1302
(801) 626-6279/6273

Utah

Utah State University
Education Resources and
Technology Center
NASA Regional Teacher
Resource Center
College of Education
Logan, UT 84321-2800
(801) 750-3377

Vermont

Norwich University
NASA Regional Teacher
Resource Center
Vermont College Educational
Resource Center
Schulmaier Hall
Montpelier, VT 05602
(802) 828-8845

Virginia

Radford University
NASA Regional Teacher
Resource Center
Dr. Carole Spencer
c/o Central Receiving
P.O. Box 6886
Radford, VA 24142
(703) 831-5127

Washington

University of Washington
NASA Regional Teacher
Resource Center
AK-50, c/o Geophysics
Department
Seattle, WA 98195
(206) 543-1943

West Virginia

Wheeling Jesuit College
NASA Regional Teacher
Resource Center
220 Washington Avenue
Wheeling, WV 26003
(304) 243-2388

West Virginia

WV Institute of Technology
NASA Regional Teacher
Resource Center
Vining Library
Montgomery, WV 15136
(304) 442-3230/3020

Wisconsin

University of Wisconsin at
LaCrosse
NASA Regional Teacher
Resource Center
Morris Hall, Room 200
LaCrosse, WI 54601
(608) 785-8148 or -8650

Wyoming

University of Wyoming
NASA Regional Teacher
Resource Center
Learning Resource Center
P.O. Box 3374
University Station
Laramie, WY 82071-3374
(307) 766-2527

National Space Grant College and Fellowship Program State Consortium Offices

Alabama Space Grant Consortium
Room 205
Materials Science Building
University of Alabama in Huntsville
Huntsville, AL 35899
(205) 895-6800

Alaska Space Grant Program
349 Duckering Building
University of Alaska Fairbanks
Fairbanks, AK 99775-0660
(907) 474-6833

Arizona Space Grant Consortium
Room 329B
Lunar and Planetary Lab
University of Arizona
Tucson, AZ 85721
(602) 621-8556

Arkansas Space Grant Consortium
Natural Sciences Building, Room 215
College of Science and Engineering Tech.
2801 South University Avenue
University of Arkansas at Little Rock
Little Rock, AR 72204
(501) 569-8211

California Space Grant Consortium
Mail Code 0216
University of California at San Diego
LaJolla, CA 92093-0216
(619) 534-5869

Colorado Space Grant Consortium
Campus Box 520
University of Colorado at Boulder
Boulder, CO 80309-0520
(303) 492-3141

Connecticut Space Grant Consortium
South Cottage
200 Bloomfield Ave.
University of Hartford
West Hartford, CT 06117
(203) 768-4813

Delaware Space Grant Consortium
215 Sharp Laboratory
Bartol Research Institute
University of Delaware
Newark, DE 19716-4793
(302) 831-1094

District of Columbia Space Grant Consortium
Department of Chemistry
Howard University
Washington, DC 20059
(202) 806-4891

Florida Space Grant Consortium
231 Aerospace Building
University of Florida
Gainsville, FL 32611-2031
(904) 392-6750

Georgia Space Grant Consortium
Room 208
Savant Building
Cherry Street
Georgia Institute of Technology
Atlanta, GA 30332-0150
(404) 853-0055

Hawaii Space Grant Consortium
School of Ocean and Earth Science and Technology
2525 Correa Road
University of Hawaii at Manoa
Honolulu, HI 96822
(808) 956-3138

Idaho Space Grant Consortium
Microelectronics Research Center
College of Engineering
University of Idaho
Moscow, ID 83843
(208) 885-6030

Illinois Space Grant Consortium
Aeronautical and Astronautical Engineering Dept.
104 South Matthews Avenue
University of Illinois at Urbana-Champaign
Urbana, IL 61801
(217) 244-8048

Indiana Space Grant Consortium
School of Aeronautics and Astronautics
1282 Grissom Hall
Purdue University
West Lafayette, IN 47907-1282
(317) 494-5117

Iowa Space Grant Consortium
408 Town Engineering Building
Iowa State University
Ames, IA 50011
(515) 294-2249

Kansas Space Grant Consortium
Dept. of Aerospace Engineering
2004 Learned Hall
University of Kansas
Lawrence, KS 66045-2221
(913) 864-4267

Kentucky Space Grant Consortium
Dept. of Physics and Astronomy
Room 225 Thompson Complex, Center Wing
Western Kentucky University
Bowling Green, KY 42101
(502) 745-6199

Louisiana Space Grant Consortium (LaSPACE)
277 Nicholson Hall
Dept. of Physics and Astronomy
Louisiana State University
Baton Rouge, LA 70803-4001
(504) 388-8697

Maine Space Grant Consortium
Maine Science and Technology Commission
State House Station #147
Augusta, ME 04333
(207) 624-6350

Maryland Space Grant Consortium
205 Bloomberg Center for Physics and Astronomy
34th and Charles Streets
Baltimore, MD 21218
(410) 516-7351

Massachusetts Space Grant Consortium
Building 37-441
77 Massachusetts Ave.
Massachusetts Institute of Technology
Cambridge, MA 02139
(617) 258-5546

Michigan Space Grant Consortium
2106 SRB
University of Michigan
Ann Arbor, MI 48109-2143
(313) 764-9508

Minnesota Space Grant Consortium
107 Ackerman Hall
University of Minnesota, Main Campus
110 Union St., S.E.
Minneapolis, MN 55455
(612) 625-8000

Mississippi Space Grant Consortium
130 Old Chemistry Building
University of Mississippi
University, MS 38677
(601) 232-5232

Missouri Space Grant Consortium
Campus Box 1169
One Brookings Drive
Washington University
St. Louis, MO 63130-4899
(314) 935-4614

Montana Space Grant Consortium
AJM Johnson Hall
Montana State University
Bozeman, MT 59717
(406) 994-6170

Hands-on experience with planetary images enhance the teaching skills of educators during a workshop organized by the Space Grant College and Fellowship Program.

Nebraska Space Grant Consortium
Aviation Institute
University of Nebraska at Omaha
Omaha, NE 68182-0508
(402) 554-3424

Nevada Space Grant Consortium
Desert Research Institute
Room 285
755 East Flamingo Road
Las Vegas, NV 89119
(702) 895-0408

New Hampshire Space Grant Consortium
Room 305A
Institute for the Study of Earth, Oceans and Space
University of New Hampshire
Durham, NH 03824-3525
(603) 862-0094

New Jersey Space Grant Consortium
Stevens Institute of Technology
Castle Point on the Hudson
Hoboken, NJ 07030
(201) 216-5558

New Mexico Space Grant Consortium
PO Box 30001
Department SG
New Mexico State University
Las Cruces, NM 88003-0001
(505) 646-6414

New York Space Grant Consortium
310 Space Sciences Building
Cornell University
Ithaca, NY 14853
(607) 255-5982

North Carolina Space Grant Consortium
Campus Box 7921
North Carolina State University
Raleigh, NC 27695-7921
(919) 515-5939

North Dakota Space Grant Consortium
Box 7306
Department of Space Studies
University of North Dakota
Grand Forks, ND 58202
(701) 777-2480

Ohio Space Grant Consortium
Ohio Aerospace Institute
22800 Cedar Point Road
Brook Park, OH 44142
(216) 962-3000

Oklahoma Space Grant Consortium
Sarkey's Energy Center
Suite 1210
College of Geosciences
University of Oklahoma
100 E. Boyd Avenue
Norman, OK 73019-0628
(405) 325-1240

Oregon Space Grant Program
College of Oceanography
Oceanography Admin. Building 104
Oregon State University
Corvallis, Or 97331-5503
(503) 737-2414

Pennsylvania Space Grant Consortium
101 S. Frear
The Pennsylvania State University
University Park, PA 16802
(814) 863-7688

Puerto Rico Space Grant Program
Resource Center for Science and Engineering
PO Box 5000
University of Puerto Rico
Mayaguez, PR 00681-5000
(809) 831-1022

Rhode Island Space Grant Program
Dept. of Geological Sciences
Box 1846
Brown University
Providence, RI 02912
(401) 863-2889

Rocky Mountain Space Grant Consortium
Room 115
Science- Engineering Research Building
Utah State University
Logan, UT 84322-4436
(801) 750-2997

South Carolina Space Grant Consortium
Dept. of Geology
120 Kinard Laboratory
Charleston, SC 29424
(803) 792-5463

South Dakota Space Grant Consortium
Institute of Atmospheric Sciences
South Dakota School of Mines and Technology
501 East St. Joseph Street
Rapid City, SD 57701-3995
(605) 394-2291

Tennessee Space Grant Consortium
Department of Mechanical Engineering
Box 1612, Station B
Vanderbilt, University
Nashville, TN 37235
(615) 322-2950

Texas Space Grant Consortium
2901 North IH 35
Suite 200
Austin, TX 78722-2348
512-471-3583
(800) 248-8742

Vermont Space Grant Consortium
Dept. of Mathematics and Statistics
College of Engineering and Mathematics
16 Colchester Avenue
University of Vermont
Burlington, VT 05401-1455
(802) 656-1429

Virginia Space Grant Consortium
Peninsula Graduate Engineering Center
2713-D Magruder Blvd.
Hampton, VA 23666
(804) 865-0726

Washington Space Grant Consortium
Mail Stop AK-50
University of Washington
Seattle, WA 98195
(206) 543-1943

West Virginia Space Grant Consortium
Room 108
Engineering Research Building
Evansdale Campus
West Virginia University
Morgantown,
WV 26506-6101
(304) 293-4099

Wisconsin Space Grant Consortium
Engelmann Hall 158
University of Wisconsin-Milwaukee
Milwaukee, WI 53201-0413
(414) 229-3878

Wyoming Space Grant Consortium
Department of Physics and Astronomy
University of Wyoming
Laramie, WY 82701
(307) 766-6267

Other Aerospace Education Resources

Resources available from organizations that explore aerospace matter but are not officially affiliated with NASA are listed in this section.

Astronauts Memorial Foundation, Inc. (AMF)

The *Astronaut Memorial Foundation* was established in the aftermath of the *Challenger* accident to honor the 16 astronauts who lost their lives in the line of duty. The "Space Mirror" at Kennedy Space Center was recognized as a national monument by a joint resolution of Congress. In addition, the foundation is creating the Center for Space Education on six acres of land adjacent to the memorial to expand and enhance NASA's existing education programs. The center will also explore and develop new learning techniques and environments for the future. Plans call for group and individual activities and demonstrations, discussions, conferences, workshops, symposiums, lectures, films, satellite transmissions, and circulation of curriculum materials. Funding for the center will be provided from the proceeds of Florida *Challenger* license plates, corporate, foundation, and individual contributions.

For more information, contact:

The Astronauts Memorial Foundation, Inc.
Mail Code AMF
John F. Kennedy Space Center
Kennedy Space Center, FL 32899
(407) 268-0272

Astronomical Society of the Pacific (ASP)

Founded in 1889, the Astronomical Society of the Pacific (ASP) is a nonprofit scientific and educational organization dedicated to supporting astronomical research and increasing public awareness and appreciation of science. In addition to its membership activities, ASP is a leader in disseminating science and technology information to students, educators, and the general public.

Of particular interest to educators is *The Universe in the Classroom*, a free newsletter/classroom resource on teaching astronomy in grades 3-12. The newsletter is designed to aid educators in including astronomy in an existing curriculum and contains articles and classroom activities. Requests for this newsletter should be supplied on school stationary, along with the grade level for which the newsletter will be used.

ASP also produces *Mercury*, a nontechnical magazine on astronomy, slide sets, videotapes, audiocassettes, a catalog of educational aids and resources, and current bibliographies on astronomy topics. In addition, the Society sponsors workshops, public lectures, and research symposiums, as well as acting as a clearinghouse for the news media on astronomical topics.

For more information, contact:

Astronomical Society of the Pacific
390 Ashton Ave.
San Francisco, CA 94112
(415) 337-1100

Challenger Center for Space Science Education

The *Challenger Center for Space Science Education*, is an international network of facilities and programs founded by the families of the seven crew members of *Challenger* flight 51L to continue the crew's educational mission.

Currently 14 high-tech space simulators are located in science centers, museums, school districts, and soon, universities throughout the United States and Canada. The simulators fly middle school students through two-hour missions, where they learn science and develop problem-solving and communication skills. Challenger Center has developed a wide range of student programs which support the Learning Center experience as well as teacher workshops, led by teachers from Challenger Center's International Faculty. The center also offers international, interactive, live teleconferences.

For more information, contact:

Challenger Center for Space Science Education
1055 North Fairfax Street, Suite 100
Alexandria, VA 22314
(703) 683-9740

Civil Air Patrol (CAP)

The Civil Air Patrol is the civilian auxiliary of the U.S. Air Force. Its services to both the Nation and the Air Force are voluntary, benevolent, and noncombatant, and its three missions are emergency services, aerospace education, and the cadet program.

The overall purpose of the aerospace education component of CAP is to communicate to its membership and the educational community information about aerospace activities and the impact of air and space vehicles on society as a whole. To meet this mission, CAP has developed an internal program and an external education program.

The internal program provides aerospace education to the CAP membership to motivate America's youth to develop leadership abilities and be responsible citizens through aerospace education and aviation-centered activities. The external program provides aerospace education to the general public.

To date, there are more than 200 CAP-affiliated aerospace education workshops conducted each year for teachers. CAP also produces aerospace education elective courses at the junior and senior high school levels and provides the textbooks and teacher's guides. In addition, CAP produces a variety of educational resources appropriate for students from K-12.

Orders can be placed by mail only, and single copies of publications are provided free of charge, with permission to reproduce them as needed. Orders should be attached to school letterhead, and a brochure and order form can be obtained by contacting the office below. In addition, CAP offers a special membership category composed of members of the educational community who wish to participate in and promote the aerospace education goals of CAP. Members of this category often serve as resources in their community and help to improve the teaching of traditional subjects in the classroom. Those wishing to become members of this special group should contact the office for further information.

For more information, contact:

Civil Air Patrol (CAP)
HQ CAP USAF/EDE
Maxwell AFB
Montgomery, AL
36112-5572
(205) 953-5387

Launch Box—Your TV Connection to Outer Space

Launch Box is an educational video series developed by the Astronauts Memorial Foundation in cooperation with Nickelodeon, a cable television network for children, and NASA. The series is specifically targeted to teachers in the 3rd through 8th grades and serves as an effective tool for introducing children to the excitement of space and space exploration.

The first of 14 half-hour programs in this series debuted on Nickelodeon on May 9, 1991, to coincide with the dedication of the Astronauts Memorial Foundation, and airs each Friday at 6:30 am EST. The programs are repeated at regular intervals. The series includes film and video footage of space missions, lesson plans, and programs for children. Each program begins with 10 minutes of background information, followed by 20 minutes of programming for children. Anyone with access to cable television can receive the programs and tape them for later use. In addition, many of the supplemental materials associated with the series are available for download via NASA Spacelink.

For more information, contact:

Launch Box
Nickelodeon Studios, Florida
1000 Universal Studios Plaza
Orlando, FL 32819
(407) 363-8500

or

NASA Spacelink
(205) 895-0028

or

Internet Address:
192.149.89.61

Federal Aviation Administration (FAA)

The Federal Aviation Administration, as part of its effort to promote better understanding of aviation and air transportation, offers a variety of educational materials to teachers and students. These include instructional materials, films, information about careers in aviation, historical publications, and a guide to materials and resources available from other sources.

For more information, contact:

Office of Public Affairs
Federal Aviation Administration
Aviation Education Program
800 Independence Ave., SW
Washington, DC 20591
(202) 366-4000

Mission 21: Science and Technology Across the Curriculum

"Mission 21" is a technology education interdisciplinary, activity-based program designed for use at the elementary level. Developed and piloted by Virginia Polytechnic Institute and State University under a grant from NASA, it is produced by Delmar Publishers.

"Mission 21" consists of two components: student materials and teacher resource materials for grades 1-2, 3-4, and 5-6. Each level includes four student theme books and a comprehensive Teacher's Resource Book. Design briefs on each theme, educational developments and classroom strategies, a resource list, a list of materials needed, and a cross-reference are provided.

Subject areas covered by this program include: energy and matter, space colonization, communication, invention, connections, machines, discovery, community, transportation, space, exploration and design. "Mission 21" is specifically designed to foster an interdisciplinary approach by tying together content from all curricular areas: science, social studies, math, language arts, physical education/health, art, and technology.

For more information, contact:

Delmar Publishers Inc.
3 Columbia Circle Dr.
P.O. Box 15015
Albany, NY 12212-5015
(800) 347-7707

National Air and Space Museum

The National Air and Space Museum, through its Education Resource Center (ERC), gives teachers access to educational materials pertaining to aviation, space, and the museum's collections. Some of these materials are produced internally, while others are produced by NASA, other Government agencies, and private organizations with an interest in promoting aerospace education.

Among the materials available are curriculum packages on specific topics for students in grades K-12, hundreds of classroom activities, arranged by subject and grade level, aerospace-related public domain and commercial software, videodiscs and CD-ROMs, filmstrips, videos, slide sets, and *Skylines*, a newsletter for teachers. In addition, ERC offers workshops, tours, and group reservations for the museum's Einstein Planetarium. Additional information on ERC and the museum's educational programs can be obtained by contacting the office below. To ensure a prompt response, requests should be specific and include the subject area or areas of interest and the grade level for which materials are to be used.

For more information, contact:

Office of Education, P-700
National Air and Space Museum
Washington, DC 20560
(202) 786-2109

Tours and Groups:

(202) 357-1400

U.S. Space Camp/ Academy

U.S. SPACE CAMP, a nonprofit educational organization, is open to students in grades 4-12, as well as educators who may participate in graduate or in-service teacher training, workshops and conferences.

The overall goal of SPACE CAMP is to motivate students to study more mathematics, science, and high technology subjects. Over 150,000 students have graduated from SPACE CAMP programs since 1982, the first year of operation. Programs provided are at the U.S. Space and Rocket Center in Huntsville, Alabama and the Astronaut Hall of Fame in Titusville, Florida. Three-, five-, and eight-day sessions take place from February through December each year.

U.S. SPACE CAMP in Huntsville is located next to NASA's Marshall Space Flight Center. In Florida, U.S. SPACE CAMP is near NASA's Kennedy Space Center. There are also licensed SPACE CAMPS in Japan and Belgium, with others soon to be developed in Canada and Italy.

SPACE CAMP tuition ranges from $450 to $750 excluding airfare. Scholarships are available in three categories: scholastic achievement, ethnic background, and financial need.

For more information, contact:

U.S. Space Camp
U.S. Space and Rocket Center
One Tranquility Base
Huntsville, AL 35807-7015
(800) 63 SPACE

For scholarship information, contact:

Scholarship Office
U.S. Space Camp
U.S. Space and Rocket Center
One Tranquility Base
Huntsville, AL 35807-7015
(no phone calls please)

U.S. Space Foundation

The U.S. Space Foundation is a nonprofit education organization promoting public awareness of the importance of America's space programs. It serves as a national resource for research and educational information on all aspects of space. The U.S. Space Foundation, in conjunction with the U.S. Air Force Academy, offers a 5-day graduate level course, "Getting Comfortable Teaching with Space," for educators. Shorter in-service programs for educators are conducted in districts and schools around the country on request. The foundation is an Education Resource Center for NASA, the FAA, the Civil Air Patrol, and the National Oceanic and Atmospheric Administration and is one of the country's top educator resource centers. Educators can select from a multitude of space and aviation materials. The foundation's "Project First Step," under a National Science Foundation grant, designed an innovative middle school science curriculum using astronauts and other scientists as role models. The foundation also sponsors the National Space Symposium in Colorado Springs. The Space Support Forum is a consortium of organizations that work to promote unity in the U.S. Space Program.

For more information, contact:

U.S. Space Foundation
2860 S.Circle Dr.
Suite 2301
Colorado Springs,
CO 80901-1838
(719) 550-1000

Visions of Exploration: Past, Present, Future

Developed by *USA Today* in cooperation with NASA, "Visions of Exploration" is an interdisciplinary educational program for students in grades 3-8. The program consists of four major components:

- *USA Today*—30 copies a week of this daily newspaper for 10 weeks.
- Classline Today—a satellite-transmitted, daily teaching plan that tailors the news to specific subjects, as well as a resource kit, and *Exploring Today*, a single newspaper page that correlates with the concepts of the program.
- Curriculum Guide—a comprehensive guide to connecting subject areas that uses a team teaching approach in science, social studies, language arts, and mathematics. The guide also includes sample lessons, discussion questions, and learning activities.
- *Explorer's Journal*—a student's journal that allows students to record their experiences with the program as it is taking place.

All four components of "Visions of Exploration" may be purchased together for $104. Educators may choose to create their own plans, using variations of the components described above.

For more information, contact::

USA Today Classline
1000 Wilson Blvd.
Arlington, VA 22229
(703) 276-6354
1 (800) USA-3415 Ext. 6354

Young Astronaut Program

The Young Astronaut Council concentrates on reaching students in the K-9 age group and supplies space-themed curriculum packages and a teacher handbook for a $40 annual subscription. Chapters are often funded by community organizations such as PTAs, Kiwanis, the Civil Air Patrol, and the Air Force Association.

Currently the program reaches one-third of the elementary and junior high schools in the United States with over 31,000 chapters worldwide. A chapter is a group of up to 30 students led by a volunteer adult using 2-3 hours of curriculum material a week. The group is also active internationally, particularly in Russia, Korea, and Japan.

The council has begun a "distance learning" program using satellite technology, offering space curriculum programming three days a week emanating from Spokane, Washington. The council also recently developed curricula, specifically targeted to reach minority students, through funding from the National Science Foundation.

For more information, contact:

Young Astronaut Council
1308 19th St., N.W.
Washington, D.C. 20036
(202) 682-1984